

# EARSeL



# NEWSLETTER

September 2007 & December 2007  
No 71 & No 72



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Front Cover – Sunset at Istanbul, venue of the 28<sup>th</sup> EARSeL Symposium and Workshops

The 28<sup>th</sup> EARSeL Symposium will be held on 2-5 June 2008 in Istanbul, Turkey. In parallel and after the Symposium, three Workshops will be held; the 3rd Workshop of the EARSeL SIG on Geological Applications, focussing on seismic hazards, 6-7 June 2008, the 4th Workshop of the EARSeL SIG on Developing Countries, 4-7 June 2008 and the 1st Workshop of the EARSeL Special Interest Group Education and Training, on 6<sup>th</sup> June 2008.

## EARSel Newsletter

ISSN 0257-0521

Bulletin of the European Association of Remote Sensing Laboratories, <http://www.earsel.org>  
September/December 2007 – Numbers 71/72

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Published by: EARSel Secretariat,  
Mediterranean Agronomic Institute of Chania &  
University of Thessaly, GR  
Printing by: Cromotema, V.N. Gaia, Portugal  
([www.cromotema.pt](http://www.cromotema.pt))

### Subscription Rates, 2007

Members receive the Newsletter as part of the annual membership fee. For non-members, the annual rates (4 issues) are as follows:

Within Europe	80€
Outside Europe	88€
Personal subscription from members	30€

### EARSel membership fees, 2007

Individual observer	330€
Laboratory/Company with fewer than 10 researchers	330€
Laboratory/Company with 10 or more members	500€

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## 1. EDITORIAL

Christmas is just around the corner and with it, comes the end of the calendar year. A year that has, unfortunately, seen central Europe flooded during the summer months and the Mediterranean region on fire. October also saw California in the US plagued by wildfires, destroying thousands of homes and also burning thousands of square kilometers of land. Hurricanes, tropical storms and tornados, affected the Caribbean region, as well as the south and west coast of the US, causing hundreds of casualties and leaving thousands homeless. Such disastrous events underline the need for disaster management, a service that the GEOSS program and its European contributor, GMES, aims to provide. Remote sensing is, and will continue to play a vital role in providing information on forecasting and mapping of the impacts on the aftermath of disasters.

As the calendar year approaches its end, this last newsletter issue for this year, contains the annual reports of the SIGs of EARSel, summing up their activities during the last twelve months. This year a new SIG in Education and Training was formed, with the initiation of the Science Education through Earth Observation for High Schools (SEOS) project, a collaboration between EARSel members and the contribution of ESA and UNESCO.

In this issue you will also find two feature articles. In the first, Keith McCloy is wondering about the future of remote sensing, while the second is dealing with the issue of desertification and the formation of the European DesertNet Initiative (EDN). Feature articles like those, appear on this newsletter occasionally and serve as a platform for individuals, on which opinions on topics can be expressed. We believe it is very important that the EARSel audience receives these opinions and hence, we would like to encourage our readers to contribute to this section of the newsletter.

As with the previous issue, shortage of time forced us to publish issues 71 and 72 together, as a double issue. This publication should be in your hands at the time the December issue of the newsletter normally arrives and hence, we should be able to switch back to four-publications-a-year from March 2008.

We would like to wish you, your families and all that are dear to you, a very merry Christmas and hope the new year will bring you health, happiness and scientific achievement.

Sincerely,

The Editorial Team



Kirimati, Kiribati (Christmas Island), Pacific Ocean, 1350 miles south of Honolulu, Hawaii)

*Image courtesy of NASA JSC Earth Sciences and Image Analysis Laboratory*

## 2. NEWS FROM MEMBERS AND SPECIAL INTEREST GROUPS

### 2.1 SIG EDUCATION AND TRAINING

#### SEOS: A new FP6 project of EARSeL

An initiative of using remote sensing in science education curricula at high schools has been launched by the European Association of Remote Sensing Laboratories (EARSeL, <http://www.earsel.org>). The project, entitled **Science Education through Earth Observation for High Schools** (SEOS) and submitted to the European Commission in the 6<sup>th</sup> Framework Programme, started in August 2007 and will have a duration of two years. It combines the efforts of 11 partners, all members of EARSeL and representing research and cultural organisations, universities and information management corporations. Based on their research results, internet-based tutorials will be realised on selected topics in Earth observation. This will also assist the students in understanding how Earth observation from space is beneficial to society by improving knowledge of our planet.

The tutorials cover themes, which are relevant to lessons in geography, biology, physics, engineering and mathematics. A particular focus is on the context of these subjects, in agreement with the interdisciplinary aspects of Earth observation, which stimulates knowledge in other science disciplines and solves problems in team work. Students will connect local personal observations to global perspectives, and will thus gain an understanding for the techniques needed to receive and interpret these data. Its results are thus suitable to achieve scientific literacy, which belongs to the key scientific education standards. Besides an overview module on Earth observation from space entitled *A World of Images*, the tutorials will cover the following topics: *Conservation of Natural and Cultural Heritages, Coral reefs, Remote sensing and geo-information in agriculture, Landcover/landuse change and land consumption, Understanding spectra from the Earth, Ocean colour in the coastal zone, Currents in the oceans measured from space, Remote sensing using lasers, 3D models based upon stereoscopic satellite data, Natural resources management, Marine pollution, Classification algorithms*

and methods, *Modelling of environmental processes*, and *Time series analysis*. The European Space Agency ESA and several national remote sensing organisations will make their data archives available to the project.

The tutorials will be realised at first in the English language. At a later stage they will be translated into other European languages, by means of modern technical language translation tools but with added human control, to make them useable in Europe and beyond. UNESCO will use the produced material for educational purpose in selected developing countries, hence extending the benefits of this project to an even larger audience.

Making Earth observation with remote sensing an element of science education provides a basis for using environmental monitoring in the work-life subsequently. The tutorials realised in SEOS span also the elements of the Global Monitoring for Environment and Security (GMES) programme, and are particularly suitable for the users of GMES services and information products at governmental organisations and in the private sector.

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### 2.2 SIG FOREST FIRES

The 6<sup>th</sup> International Workshop on Advances in Remote Sensing and GIS Applications in Forest Fire Management was organised by the Laboratory of Forest Management and Remote Sensing, Faculty of Forestry and Natural Environment, Aristotle University of Thessaloniki in collaboration with the University of Alcalá and the Joint Research Centre of the European Commission. The Thessaloniki workshop was the most recent of a series of technical meetings that were organised by the EARSeL SIG on Forest Fires after its foundation in 1995. The previous meetings were held in Alcalá de

Henares (1995), Luso (1998), Paris (2001), Ghent (2003) and Zaragoza (2005).

The main focus of the workshop was on the operational use of remote sensing in forest fire management. However, a large number of paper contributions were also related to the pre-fire planning and management, as well as the real-time detection and monitoring of active fires, and the evaluation of the effects of forest fires. The workshop was attended by 102 participants from 12 different countries. The most of the participants originated from European Mediterranean countries with smaller numbers of attendants originating from other European countries such as Germany, Switzerland, Belgium and the U.K. Finally, a small number of participants originated from non-European countries such as Malaysia, Canada and the USA.

Pre-workshop activities included an *open to the public* session comprised three lectures on the 'Global Change and Forest Fires: the role of Mediterranean biomes' by Chris Justice (University of Maryland), 'Forest - Environmental monitoring in Europe: the role of Remote Sensing' by Jesus San Miguel-Ayaz (Joint Research Centre), and 'Operational Use of RS In Forest Fire Management: the ESA Experience' by Marc Paganini (European Space Agency).

The main activities of the Workshop included 6 invited lectures, 3 poster sessions, 3 general discussion sessions, a round-table discussion session and a GOFC-GOLD Fire Implementation Team special session. The different activities of the Workshop are presented in more detail, in turn, below:

#### INVITED LECTURES

The invited lectures focused on the following topics:

- *Research issues in pre-fire planning and management* by Steven Yool, University of Arizona,
- *Operational issues in pre-fire planning and management* by Ana Sebastián, Spanish Ministry of Environment,
- *Research issues in fire detection and monitoring* by Martin Wooster, Kings College - University of London,
- *Operational issues in fire detection and monitoring* by Tim Lynham Canadian Forest Service,
- *Research issues in Post-Fire Evaluation* by Eric Kasischke, University of Maryland,

- *Operational issues in Post-Fire Evaluation* by Jan Kucera, Joint Research Centre.

#### POSTER SESSIONS

The poster sessions focused on three topics, namely, 'Pre-fire Planning and Management' (1<sup>st</sup> session), 'Fire Detection & Monitoring' (2<sup>nd</sup> session), and 'Post-Fire evaluation' (3<sup>rd</sup> session). During the first session nineteen posters were presented dealing with mapping and modelling of fire occurrence, fuel type mapping, fuel moisture content (FMC) estimation, fire behaviour modelling and fire risk modelling. During the second poster session 12 posters were presented focusing on the detection and monitoring of active fires. Finally, during the third and last poster session 17 posters were presented in relation to burned area mapping, burn severity mapping and post-fire mapping and monitoring. It should be noted that during the poster sessions one-to-one discussions with the authors was encouraged while after the end of each session a general summary of the session was made.

#### GENERAL DISCUSSIONS

The general discussions were based on the active participation and the brainstorming of the attendants on the subjects that were briefly introduced by the coordinators. The first general discussion on 'Pre-fire Planning and Management' was coordinated by Jesus San Miguel-Ayaz (Joint Research Centre, Italy), the second general discussion on 'Fire Detection & Monitoring' was coordinated by Chris Justice (University of Maryland, USA) while the third general discussion on 'Post-Fire evaluation' was coordinated by Pilar Martin (CSIC, Spain).

#### ROUND TABLE DISCUSSION

The round-table focused on the 'Operational use of remote sensing – User needs and priorities' and was moderated by Ioannis Gitas (Aristotle University of Thessaloniki) with the participation of Steffen Kuntz (Infoterra Global), Marc Paganini (European Space Agency), Ana Sebastián (Spanish Ministry of Environment), Popi Ksouri (Greek Forest Service – Forest Mapping Unit), and Stelios Karapournalidis (Greek Forest Service – Forest Protection Unit).

In addition to the workshop sessions, a meeting of the fire implementation team of the Global Observation of Forest Cover – Land Dynamics (GOFC-GOLD) program was held the day before the workshop in the same venue. It was discussed the new programs related to derive fire information

from satellite systems: mainly the Geostationary satellites, the Globcarbon program from ESA and the NPP from NASA, the organization of a Global Fire Early Warning system, coordinated by the Canadian Forest Service, with two workshops in Ghana and Edmonton, and the input of the GOF-C-GOLD program to the next FAO framework assessment in 2010.

#### WORKSHOP Final Declaration

As a result of the workshop debates, the following final declaration was approved:

The EARSel Special Interest Group (SIG) on Forest Fires acknowledges the growing interest of the research community in using Earth Observation data for deriving critical information for fire prevention and fire effects assessment. The number of projects and publications completed in the last decade has been steadily increasing, as well as the use of these data for operational applications at regional, national and international scales.

To maintain and enrich this steady flow of research and operational studies, the Forest Fire SIG, recognizes the need of addressing the following four critical issues:

- 1) Encourage the maintenance of Earth Observation platforms that assure a global and systematic 5 day coverage at medium-high spatial resolution (30 m). We believe that international organizations programs (e.g EARSel, CEOS, IGOL, GOF-C-GOLD, GEO) should encourage the space agencies to work in concert to provide the necessary global acquisition strategy to achieve this goal and assure long term data continuity and archival, as well as free, timely and open access to data.
- 2) Extend the participation of European researchers in international programs addressing the role of fire in global climate and land cover change.
- 3) Strengthen support for research in the use of remotely sensed data for fire-related applications. Operational uses of these data should be based on proven methodologies and current uncertainties need to be addressed.
- 4) Promote the creation of a network of validation sites to be used for accuracy assessment of fire-related research, as well as to validate the various semi-operational products currently available. These sites should have common field protocols and metadata, and include both the reference information (e.g., burned perimeters, burn severity plots,

etc.), and the raw images used to create that information.

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## 2.3 SIG FORESTRY

The EARSel Special Interest Group for Forestry has during recent years arranged a number of workshops and specialised conferences, which also have been co-sponsored by ISPRS WG VIII/11 Sustainable Forest and Landscape Management and other organisations. The ForestSat 2005 Workshop was arranged in Borås, Sweden, 31 May – 3 June 2005. Thirteen selected papers from this workshop have now been expanded and published as a special issue in Remote Sensing of Environment. The issue is number 4, volume 110, from October 2007. Guest Editors have been Daniel N.M. Donoghue, University of Durham, and Ronald E. McRoberts US Forest Service.

The more specialised, and highly successful, workshop 3D Remote Sensing in Forestry was held at BOKU, Vienna, 14-15 February 2006. The proceedings volume is available at: <http://www.rali.boku.ac.at/3drsforestry.html?&&L=1>. Also this workshop has resulted in a special issue, this time in International Journal of Remote Sensing, with Håkan Olsson, Werner Schneider and Tatjana Koukal and as guest editors. Eighteen papers have successfully undergone the now completed review process and the issue has been submitted to the publishers of the journal.

The ForestSAT conference about remote sensing of forests in general, but with an operational touch, was held for the third time November 5-7, 2007. The meeting was hosted by Cemagref in Montpellier, France, with Michel Deshayes as main organiser. About 170 contributions were submitted. The proceedings will be made available online on the conference website (<http://forestsat07.teledetection.fr/>) a few weeks after the conference.

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## 2.4 SIG GEOLOGICAL APPLICATIONS

As a follow up to a first workshop on remote sensing of geohazards with emphasis on lowland geohazards (flooding & subsidence) organized in Warsaw, Poland on 2 June 2006, the Special Interest Group Geological Applications in 2007 organized a two-day workshop on geohazards with emphasis on mountainous areas. This event took place on 8 and 9 June 2007 in Bozen, Italy. The workshop was co-organized by the Geological Remote Sensing Group of RSPSOC and the IGOS working group on Geohazards. Chairmen were Prof. Freek van der Meer (ITC, Netherlands), Dr. Richard Teeuw (University of Portsmouth, UK) and Dr. Stuart Marsh (BGS, UK). The workshop was co-hosted by Dr. Marco Giardino (University of Turin, Italy), Dr. Marc Zebisch (EURAC Research, Bolzano, Italy) and Dr. Maria Antonietta Dessena (ERIS, Cagliari, Italy).

Geohazards have been recognized as one of the prime fields of focus for earth scientists for the coming decade. Also on the political agenda, geohazards are more and more claiming a prominent role. The EU and ESA initiative GMES (Global Monitoring of Environment and Security), the European contribution to GEOSS (the Global Earth Observation System of Systems), focuses on environmental control and security issues including land degradation, land cover changes, geohazards etc. Earth observation plays a vital role in both understanding the geological processes shaping the earth's dynamic environment and the natural hazards that they entail. Altogether this formed the preamble to organizing a succession of geohazards workshop within EARSel.

The Bozen workshop addressed issues of relevance to geohazards in mountain areas. The first day of the workshop (8 June 2007) was dedicated to scientific presentations. A Keynote was given by Mattia Crespi and Marco Giardino of the Sapienza Università di Roma and the University of Turin, Italy, respectively followed by 21 paper and poster presentations in the following themes:

- Session 1: overview of mountain geohazards
- Session 2: earthquakes
- Session 3: mass movements
- Session 4: subsidence
- Session 5: other related geohazards

Presentations included in-depth theoretical and fundamental studies of remote sensing data acquisition and analysis relevant to the hazard themes treated and papers focusing on applications and case studies from the region. The workshop attracted presentations and participants interested in alpine geohazard research with some presentations on the Carpathian Mountain chain.

During the second day of the workshop (9 June 2007), geohazards were studied in the field during a trip through the scenic Dolomite Mountains of Northern Italy. Landslide prone areas in this mountain chain were visited where a local geologist explained mitigation and monitoring measures based on routine measurements with PbINSAR techniques.

In total 35 participants attended the workshop and 20 participants joined the field excursion.

For 2008, the SIG intends to host sessions at the EARSel Istanbul congress and discussions are ongoing to organize the third geohazard workshop back-to-back to the EARSel congress. Theme of this workshop would be seismic hazards. In addition, the SIG Geological Applications is in active support of the first international conference on disaster management and emergency response in the Mediterranean region. This event will take place from 22-24 September 2008 in Zadar, Croatia. Conference chairman is Dr. Marinko Oluic (geo-sat@zg.htnet.hr).

For more information on the work of the SIG Geological Applications consult:

<http://www.itc.nl/personal/siggeo>

Suggestions and recommendations for future events can be directed to the chairman of the SIG, Prof. Freek van der Meer ([vdmeer@itc.nl](mailto:vdmeer@itc.nl)).

## 2.5 SIG LAND USE AND LAND COVER

The SIG activities are mainly concentrated on the organisation of workshops and dedicated sessions during the EARSel Symposium. After a first thematic workshop adjunct to the Dubrovnik Symposium in 2004, the **Second Workshop of the SIG LULC** took place from **September 28 to 30 2006 in Bonn**, Germany. The workshop with the theme "Application & Development" aimed at linking current research developments with the existing strong

application and operational components. This was also reflected by the spectrum of participants and contributions from operational service providers and a great variety of international research institutions. Many of the large national and European initiatives in land use cover mapping presented results and ongoing work. In total, more than 130 participants from 25 countries registered for the workshop, mainly from European countries but with various overseas contributions from the Americas, Asia and Africa. The workshop represented the broad spectrum of research and the active community in this field.

The 3-day workshop programme was subdivided into six thematically grouped sessions on methods, crops & biophysical parameters, large-scale mapping, land degradation and urban land cover. EARSel's president, Rudi Goossens, and the rector of Bonn University, Matthias Winiger, opened the workshop followed by a keynote by Malcom Davidson from ESA-ESTEC on "Trends in spaceborne earth observations for land use/land cover applications". On behalf of the ESA GOCF-GOLD office Martin Herold held a tutorial introducing the UN Land Cover Classification System (LCCS) to the audience. It was followed by a lively discussion and a special session on land cover harmonisation including the various European and national land cover activities. Two interactive poster sessions on day one and two with more than 50 contributions caused considerable attraction and completed the successful workshop programme.



*Martin Herold (ESA GOCF-GOLD/Univ. Jena) giving a tutorial on the UN Land Cover Classification System*

The best poster was elected by all participants and awarded to Tatiana Plantier from the Portuguese Geographic Institute in Lisbon, Portugal for her paper "Spectral analyses and classification of IKONOS images for forest-cover characterisation". Cubicworld e.V. and Alta4 jointly provided the award of the best master student contribution to Sarah Crabbe (Ghent University, Belgium) for her paper titled "Studying flooded grasslands in the Waza-Logone region of northern Cameroon using ENVISAT ASAR alternating polarization images".

During the panel discussion at the closing session Ana Souza (EEA, Denmark) concluded that a huge method pool is available to a dynamic community. The intensive use of CORINE shows that the data is urgently needed and that further synergies between CORINE and national initiative should be pursued. More detailed land use/land cover information would also be very welcomed by the user community. George Büttner (European Topic Center & FÖMI, Hungary) recommended a closer link between scientific method development and practical results or applicability. He advised to keep the user requirements in mind. Gunter Menz (ZFL, Bonn) encouraged the SIG to make use of the young working group and possibly target and establish a student exchange network to further strengthen the cooperation between the groups.

The organizers would like to thank all participants for their coming to Bonn and the lively discussions of the oral and poster presentations. The workshop manuscripts are published on a proceedings CD and can be accessed on the SIG website:

<http://www.zfl.uni-bonn.de/earsel/earsel.html>

During the Bolzano Symposium in 2007 several sessions on land use and land cover took place. The next workshop of the SIG Land Use and Land Cover is envisaged for September 2008 to be held in Lisbon, Portugal, organized by M. Caetano and his group at the Portuguese Geographic Institute. More details will be circulated in due time.

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## 2.6 SIG 3D REMOTE SENSING

Twelve presentations of the EARSel symposium in Bolzano are related to the SIG 3D Remote Sensing. Gürcan Büyüksalih presented a geometric analysis of Bilsat-1 images. This small optical satellite was active up to last year. The information contents of analogue aerial photos has been compared with the information contents of large format digital camera images with the result, that the information contents of the investigated digital cameras is better. Hannes Raggam demonstrated the high potential of UltraCamD-images for mapping. It is quite superior to analogue photos.

Karsten Jacobsen gave a status report over 3D-Remote Sensing. The fast growing number of space sensors offer new opportunities. With Cartosat-2 and Kompsat-2 additional systems having 1m ground sampling distance (GSD) are active and more countries entered the very high resolution space image market. The new stereo sensors Cartosat-1 and ALOS/PRISM solved the problems of stereo pairs from the same orbit, simplifying the generation of height models. The orientation of space images should be done with rigorous models including the bias corrected, space oriented RPCs, because some approximate solutions are leading to not acceptable results. For aerial applications a clear trend to digital cameras exist, which are supported by aerial laser scanner data.

The analysis of high resolution digital elevation models generated by means of Cartosat-1, QuickBird, OrbView-3 and IKONOS stereo pairs showed the now existing capacity in this field. Beside the nearly world wide coverage with SRTM height models, space image models are still important for more detailed and usually more precise height information. At least the gaps in the SRTM height models have to be covered by other information.

The continuous development in the field of space images is shown with the successful launch of WorldView-1, improving the resolution to available 50cm GSD. This will be the case also for GeoEye-1 which is delayed to the first quarter 2008.

In cooperation with the SIGs Urban Remote Sensing, Developing Countries and Radar a workshop will be held in March 2008 in the Ruhr University Bochum, Germany.

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## 2.7 SIG RADAR REMOTE SENSING

Year 2007 has been a particularly interesting one for radar remote sensing. It has indeed witnessed the placement into operation of two satellite-based, high-resolution, radar Earth Observation systems, namely the German TerraSAR-X and the first item in the Italian COSMO-SkyMed constellation of four. Images from both systems have been publicised, and distribution of data is already in progress for TerraSAR-X, while for C/S it is foreseen to start early next year when the results of a call issued to the scientific community are expected.

We have naturally proceeded to mention this in the new version of the SIG web site, which has been just put into operation on a Web server in Pavia. The new site makes updating easier and this feature will be exploited largely from now on. Links to interesting radar-related web sites have been added. Plans have been set to add tutorials on radar remote sensing and, more in general, to make it a relevant source of information for people interested in such topics.

On the side of conference activity, the main event in 2007 was a specific session organized by the SIG Radar Remote Sensing at the 27<sup>th</sup> EARSel symposium in Bolzano, Italy, 4-7 June 2007.

Five papers were scheduled, covering all major fields of research of Radar Remote Sensing, such as urban feature extraction by means of structural image analysis and simulations, quality assessment of InSAR digital elevation models, Differential SAR-Interferometry for subsidence monitoring, and altimetry. Although –unfortunately– two presenters did not show up, the high quality of the remaining three presentations has overcompensated.

Antje Thiele from FGAN-FOM in Ettlingen, Germany, demonstrated an approach for

model based building reconstruction from multi-aspect InSAR data. She considered features of different building types, such as flat roof or gabled-roof buildings, for the reconstruction. Her results encourage further efforts in this direction.

Umut Sefercik from Zonguldak University, Turkey, presented results of the evaluation of SRTM DEM. As test site Zonguldak was chosen, which is characterized by steep gradient terrain with significant height variations.

C. E. Medina from University of Cadiz, Spain, gave an overview about activities to monitor Lake Izabal in Guatemala with different methods, including radar altimetry.

Our plans for the future include a joint workshop in Bochum, Germany, in March 2008, together with EARSel SIGs Developing Countries, Urban Remote Sensing, and 3D Remote Sensing. We have already invited a few qualified presenters, which are expected to send valuable contributions the workshop.

For what concerns the web site, we plan to prepare and publicise simple tutorials –as already mentioned- on radar remote sensing, picking ideas and guidelines from the courses we teach in our respective universities. On a longer term, we would like to add a reference document repository to the SIG web site and possibly also a forum.

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## 2.8 SIG REMOTE SENSING FOR ARCHAEOLOGY AND CULTURAL HERITAGE

The 1<sup>st</sup> International Workshop of the EARSel Special Interest Group (SIG) on REMote SEnsing of ARchaeology and Cultural Heritage (RE.SE.AR.C.H) will take place in Rome, (Italy) from 1-3 October,

2008. The workshop is organized by the Institute of Environmental Analysis (IMAA) of the Italian National Council Research (CNR) and the Institute of Archaeology and Cultural Heritage (IBAM) of the CNR. The Rome workshop is the first technical meeting organized by the EARSel SIG on ARchaeology and Cultural Heritage after its foundation and formal launch in June 2007 at the 27<sup>th</sup> EARSel Symposium in Bozen (Italy). At the end of September 2007, more than 80 researchers and laboratories belonging to 18 European and non European countries have joined the Re.Se.Ar.C.H. SIG.

The main subject of the workshop will be the operational use of remote sensing (from space, airborne and ground), GIS (geographic Information system), and IT (Information Technologies) for supporting archaeological research and improving knowledge, preservation and management of cultural heritage. Paper contributions are expected to focus on the following topics:

- Aerial archaeology
- Remotely sensed data processing, analysis and interpretation
- Development of advanced methods for image and data analysis applied to archaeology and cultural heritage knowledge, enhancement, preservation, management etc.
- Integration of active and passive space/air borne and ground remote sensing techniques for cultural heritage
- Multiscale, multidata multisensor approach for archaeological prospection
- Sub-surface reconstruction based on GPR, magnetic and electrical tomography,
- Inverse problems related to sub-surface sensing
- Integration of remote sensing and ground truth
- Remote sensing and GIS for archaeological landscape and paleo-environmental studies
- Virtual reality, 3D visualization, open source and Web-GIS

The main activities of the Workshop will include lectures given by invited speakers, oral and poster sessions, round table discussion and a technical field excursion.

Abstracts of not more than 500 words should be submitted by e-mail to [earsel-archsigs@imaa.cnr.it](mailto:earsel-archsigs@imaa.cnr.it)

Key deadlines are:  
Submission of one page abstracts:  
31 march 2008

Notification of acceptance: 30 April 2008  
 Camera-ready copy of extended manuscripts: 30 June 2008

Full texts of the lectures given and the extended abstracts of papers presented will be included in the Proceedings book of the workshop. Selected papers presented during the workshop will be included in a special issue of an international scientific journal. Please visit <http://www.ibam.cnr.it/EARSel-arch> for registration information, prices and workshop updates. Queries can be addressed to [earsel-archsig@imaa.cnr.it](mailto:earsel-archsig@imaa.cnr.it)

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## 2.9 SIG URBAN REMOTE SENSING

Urban Areas are growing rapidly in all countries of the world. Urban growth and its associated problems are very challenging tasks in which remote sensing imageries could help to get up-to-date information. During the last decades and especially during the last few years we recognized rapid advances in the imaging technology (e.g. high spatial resolution) and in the image analysis techniques. According to the growing awareness of urban areas, agglomerations and mega cities more and more scientists focus on topic related to them. To further support research and information exchange in this area EARSel established a new SIG "Urban Remote Sensing". This new SIG is chaired by Prof.Dr. Carsten Jürgens from Ruhr-University Bochum, Germany. Co-chair is Prof. Dr.Derya Maktav from Istanbul Technical University. Turkey.

In addition, the SIG will be in active co-operation with ISPRS-WG-VIII/1. Prof.Dr. Derya Maktav is also Chair and Prof.Dr. Carsten Jürgens is the Co-chair in ISPRS-

WG VIII/1 "Human Settlements and Impact Analysis"

The SIG aims to be a forum for the community interested in the use of remote sensing and GIS for urban areas. It will organise workshops, tutorials and special conference sessions to disseminate urban remote sensing knowledge. Furthermore, it aims to bring together experts from the various agencies working in the field of remote sensing and GIS for urban areas and create a forum for international discussion to better prepare the urban remote sensing and geography communities for new developments in technology and application.

On 11-13 April 2007, an Urban Remote Sensing Joint event took place in Paris, France, with the 4<sup>th</sup> IEEE GRSS/ISPRS Joint Workshop on Remote Sensing and Data Fusion over Urban Areas, running in parallel with the 6<sup>th</sup> International Symposium of Remote Sensing of Urban Areas. For more information visit:

<http://tlc.unipv.it/urban-remote-sensing-2007/>

In the following year the SIG Urban Remote Sensing will co-organise a joint EARSel workshop (future event 5.4, page 32). Also in 2008 a book titled "Urban Remote Sensing" will be published, edited by Prof.Dr.Carsten Jürgens and Prof.Dr.Tarek Rashed.

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### 3. NEWS ITEMS

#### 3.1 UNESCO AND THE EUROPEAN SPACE AGENCY EXHIBITION: "PLANET EARTH: FROM SPACE TO PLACE"

Space and in particular, remote sensing being exhibited at the United Nations Educational, Scientific and Cultural Organization (UNESCO) Headquarters, Paris.

UNESCO and the European Space Agency (ESA) and other partners have been working to use space technologies to protect our World Heritage, biodiversity and natural resources. On the 22 October at UNESCO Paris Headquarters, the two organizations highlighted their joint activities with an exhibition, "Planet Earth: From Space to Place", this coincides with the 34th UNESCO General Conference. The Director General of UNESCO M. Koïchiro Matsuura inaugurated the exhibition in the presence of His Majesty Carl XVI Gustaf, King of Sweden.

Delegations from 193 Member States to UNESCO are attending the General Conference, including governments, ministers of education, science and communication, intergovernmental and non-governmental organizations as well as foundations. The exhibition helps to raise awareness among these decision makers of the fundamental role of space applications in the pursuit of knowledge to understand how our planet functions and for future sustainable development to protect its beauty and precious resources.

"Planet Earth: From Space to Place" celebrates the diversity and complexity of our planet, it explores the challenges facing it, in particular climate change, and highlights UNESCO's contribution to its sustainable development. UNESCO and ESA demonstrate the important role of space technologies to observe our complex and changing planet Earth and to manage its resources in a wise manner.

This is a timely and pertinent initiative, as never before in living memory has the planet been subjected to such rapid and profound change in both in terms of the physical environment. This is particularly the case considering global climate change.

UNESCO with ESA and other partners, are assisting developing countries to use space



*Yucatan peninsula (Mexico) as seen from Envisat (Image from ESA website)*

technologies and remote sensing for managing water resources, monitoring World Heritage sites and Biosphere Reserves as well as observing changes, for example in sea temperature, which contributes to our understanding of climate change. This partnership is based on the philosophy that the 'extraordinary cultural and natural diversity is an important resource for the life and inspiration of humanity. Its protection should be the responsibility shared by all of the international community,' Stefano Bruzzi (Earth Observation, ESA).

Through multimedia presentations and satellite imagery taken from ERS2 and ENVISAT, "Planet Earth: From Space to Place" shows how space is helping with the study of the Earth's atmosphere, meteorology, the oceans, the glaciers and marine wildlife, vegetation, ground movements of the Earth, and all the other aspects of Earth.

"We live on a unique, diverse and ever-changing Planet Earth travelling through space in a vast universe. Through this exhibition let us celebrate its beauty but also reflect on its fragility and how UNESCO can continue to contribute to our place's sustainable development from the perspective of space." M. Koïchiro Matsuura (Director General UNESCO).

Jessica Bunning  
Programme Specialist  
UNESCO

### 3.2 WORLDVIEW-1 FIRST IMAGES

DigitalGlobe, provider of the world's highest-resolution commercial satellite imagery and geospatial information products, today revealed the first images from WorldView-1, the highest resolution, most agile commercial satellite ever flown. WorldView-1 was successfully launched on September 18 from Vandenberg Air Force Base and has been undergoing a routine calibration and check-out period. DigitalGlobe expects WorldView-1 to be fully operational and delivering imagery products by the end of the year if not sooner. DigitalGlobe is the only company operating a constellation of sub-meter commercial imaging satellites and in late 2008, will complete WorldView-2 which will provide eight bands of multi-spectral data for life-like true color imagery.

WorldView-1, built by Ball Aerospace and Technologies Corporation with the imaging sensor provided by ITT Corporation, is a high-capacity, panchromatic imaging system featuring half-meter resolution imagery. With an average revisit time of 1.7 days, WorldView-1 is capable of collecting up to 750,000 square kilometers (290,000 square miles) per day of half-meter imagery. Frequent revisits increase image collection opportunities, enhance change detection applications and enable accurate map updates. The satellite is capable of collecting, storing and downlinking more frequently updated global imagery products than any other commercial imaging satellite in orbit, allowing for expedited image capture, processing and delivery to customers where speed is a driving factor. WorldView-1 is equipped with state-of-the-art geo-location accuracy capability and exhibits unprecedented agility with rapid targeting and efficient in-track stereo collection.

The images can be viewed at **DigitalGlobe** ([http://www.digitalglobe.com/worldview-1\\_images.html](http://www.digitalglobe.com/worldview-1_images.html)) and **Eurimage** ([http://www.eurimage.com/wv/wv1\\_first.html](http://www.eurimage.com/wv/wv1_first.html)).

*Source: DigitalGlobe website*

### 3.3 CAMPAIGN IMAGERY FURTHERS SENTINEL DEVELOPMENT

After more than a year of careful analysis, the results from extensive airborne campaigns carried out in support of ESA's

Sentinel-1 and -2 missions prove extremely promising - ultimately helping to pave the way for future Earth Observation-based services relating to land-surface monitoring. As with all Earth Observation missions, a crucial part of the development process is assessing the performance of the on-board instrumentation as well as the algorithms that will be used to transform the raw satellite data into information products required by the end-user. To this end, numerous field campaigns are carried out. Two such campaigns, dedicated to simulating both Sentinel-1 and -2 imagery over land, have just had their results presented at a workshop held at ESA's facilities in the Netherlands.

Sentinel-1 and -2 constitute the first two satellites in a series of operational missions that ESA is developing within the Global Monitoring for Environment and Security (GMES) programme. GMES is a European Commission initiative through which ESA carries the responsibility for the implementation of the space component to provide Earth Observation data for information services to aid sustainable development and global governance with respect to environmental and security policies.

The workshop focused on the encouraging results of the AGRISAR (AGRIcultural bio/geophysical retrieval from frequent repeat pass SAR and optical imaging) and the EAGLE (Exploitation of AnGular effects in Land surface observations from satellites) campaigns that were carried out last year. After extensive analysis, results of these multi-faceted campaigns on the investigation and validation of bio- and geophysical parameters, retrieval and simulation of both Sentinel-1 and -2 products were presented to scientists from all over the world who gathered at ESA-ESTEC on 15-16 October.

"We collected a huge amount of data during the campaign, the SAR data alone amounted to more than 100 Gigabytes. Just as encouraging though, was the fact that the data were of excellent quality," stated Irena Hajnsek, the AGRISAR Study Manager from DLR. "This multidisciplinary campaign provided a unique opportunity to realise both radar and optical measurements allowing us to better interpret the eventual data that Sentinel-1 and -2 will deliver."

The ESA AGRISAR campaign was carried out over an agricultural area north of Berlin in Germany and involved more than 15 different

institutes from eight different countries. Unique in scope and scale, the campaign was designed to acquire radar and optical data throughout the entire growing season. Airborne coverage of the sowing period right through to harvesting meant that it was possible to observe how the change in crop growth was reflected in the SAR data.

The campaign ran for four months with radar data collection occurring nearly every week. Joint radar and optical airborne measurements were made at two time intervals over the same agricultural site and once in conjunction with the EU EAGLE project over forest and grassland sites in the Netherlands. Three main airborne sensors were involved: the E-SAR system from DLR in Germany, the AHS from INTA in Spain and CASI from ITRES Research Limited in Canada. To make a comparison with measurements taken from the air, intensive and simultaneous measurements were collected on the ground during each flight survey.

As well as improving the understanding of how best to interpret and retrieve information over land from the eventual Sentinel-1 and -2 missions, the campaigns also provided a glimpse of the future applications that would lead to a better understanding of our environment. Scientists attending the workshop were very encouraged by the results of the campaigns as highlighted by Evert Attema, ESA's Mission and System Manager for Sentinel-1, "The success of the AGRISAR and EAGLE campaigns means that for the first time we have simulated products for both Sentinel-1 and Sentinel-2 providing a real insight into the future products these two missions will realise for land-monitoring applications. This type of information will prove invaluable for GMES services associated with land-use classification, fresh water management and food security."

*Source: ESA web-site*

### **3.4 ESA TRAINS NEXT GENERATION OF EARTH OBSERVATION SCIENTISTS**

More than 60 students from 18 European countries gathered at the Universidade Nova de Lisboa in Portugal to attend a six-day advanced training course devoted to exploiting ESA Earth Observation remote sensing data for land applications, such as

forestry, fires, floods and water availability. The course introduced students to remote sensing applications and illustrated the use of specific software tools for exploiting Earth Observation (EO) data from ESA's ERS and Envisat satellites, Third Party Mission (TPM) satellites and the Explorer satellites.

"This type of training encourages the use and exploration of European information and technology and is important because it is part of the foundation of the training of the future leading European investigators in remote sensing," Marco Painho, Director of the Institute of Statistics and Information Management at Universidade Nova de Lisboa, said.

The course had a particular focus on the theoretical concepts of radar, optical and thermal sensors. Accounting for the different remote sensing backgrounds of the students, the fundamentals of the course were presented in parallel sessions covering both basics and advanced concepts in each field.

The main applications of land remote sensing, which were addressed through keynote lectures and dedicated hands-on sessions, included land cover and land use classification techniques, forest and crop mapping, forest fire detection and drought monitoring. Advanced techniques such as SAR Interferometry, used for detecting very slight volcanic or tectonic land motion, and SAR Polarimetry, employed to add multi-polarised 'colour' to radar images for enhanced land-cover mapping, were also covered. To facilitate the handling and exploitation of ESA and TPM data, ESA provides a number of free software tools, which the students trained interactively with during the course.

Upon completion of the training, the students received two European Credit Transfer and Accumulation System (ECTS) credits by Universidade Nova de Lisboa. ECTS is the basis for comparing the competence and performance of students of higher education across the European Union and other collaborating European countries. ESA is planning a first advanced training course in atmosphere remote-sensing to be held at University of Oxford, UK, from 15 to 20 September 2008.

*Source: ESA web-site*

### 3.5 ERS-2 DATA VITAL FOR MARITIME SECURITY

Data from ERS-2, ESA's (European Space Association) veteran spacecraft, is experiencing an increasing demand as the 12-year-old mission's products and services are playing a vital role in the initial activities for Global Monitoring for Environment and Security, such as the MARitime Security Service project which addresses the European concern of illegal marine trafficking.

The MARitime Security Service (MARISS) is a GMES Service Element (GSE) initiative that integrates near real time satellite Earth Observation (EO) data with conventional vessel tracking data to deliver an understanding of the maritime situation to coast guards, navies and border police forces in Europe. Within the MARISS partnership, service providers require Synthetic Aperture Radar (SAR) imagery such as that provided by ERS-2 within 15 to 20 minutes in order to rapidly detect vessels and extract their positions. This data is integrated with coastal surveillance systems such as coastal radar, the Automatic Identification System (AIS) and the Vessel Monitoring System (VMS) for tracking fishing vessels.

With this information, service providers can locate all vessels not reporting their position using conventional identification systems and transmit the position of these non-cooperative vessels to the relevant authorities in less than 30 to 60 minutes of the satellite overpass.

#### *Satellite synergy within 30 minutes*

Key users have also expressed considerable interest in the 30-minute time difference between the overpasses of ERS-2 and Envisat. The minimal time lag allows data to be retrieved and used from ERS-2 when Envisat is being used in a different mode. For example, in the case of oil slick monitoring, Envisat can obtain acquisitions in Wide Swath Mode while ERS-2 provides a more detailed view. This unique capacity is approaching update times of conventional systems, such as the AIS, and is currently unique for satellite surveillance systems.

#### *ERS-2 sets stage for GMES*

ERS-2 with its well-defined products and services has an important role to play in the preparation for GMES, building on the

established customer base through the generation of policy-relevant services. Until the launch of GMES-dedicated missions, such as Sentinel, the retention of ERS-2 will provide the necessary additional capacity to maintain the uninterrupted data flow that is critical to the programme.

GMES responds to Europe's needs for geo-spatial information services by bringing together the capacity of Europe to collect and manage data and information on the environment and civil security, for the benefit of European citizens. As the main partner to the European Commission (EC) in GMES, ESA is the implementing agency for the GMES Space Component, which will fulfil the space-based observation requirements in response to European policy priorities.

The GMES Service Element (GSE) has been preparing user organisations in Europe and worldwide for GMES by enabling them to receive and evaluate information services derived from existing EO satellites since 2002.

*Source: ESA web-site*

### 3.6 A ROADMAP FOR CALIBRATION AND VALIDATION

The volume of data acquired by more than 50 Earth Observation satellites is increasing at an exponential rate and is providing unprecedented synoptic views of our planet. Because these satellites often use different methodologies, using data for trend analysis and environmental monitoring can be difficult, making it essential to establish globally recognised guidelines for Calibration and Validation processes.

More than 50 experts from space agencies and organisations around the world met earlier this month at the GEO/CEOS Workshop on Calibration and Validation Processes in Geneva, Switzerland, to identify and scope key elements needed to develop and implement a data quality strategy. Calibration is the process of quantitatively defining the system responses to known, controlled signal inputs. Validation is the process of assessing, by independent means, the quality of the data products derived from the system outputs.

The workshop, hosted by the Group on Earth Observations (GEO) and ESA from 2 to 4 October, was structured around four main sessions:

- Cal/Val site characterisation & classification
- Satellite and in situ Cal/Val data access
- Methodology and guidelines for Cal/Val
- Harmonisation of quality information

The dialogue and recommendations will be used to achieve the ultimate goal of the Global Earth Observation System of Systems (GEOSS) for data inter-operability and inter-comparison. Prof. Jose Achache, Director, GEO Secretariat, stressed that in order for GEOSS to be fully successful, there must be calibration, validation and intercalibration between all instruments.

The Committee on Earth Observation Satellites (CEOS), the space contribution to GEOSS, identified the need to take a more active role in tackling these issues. The CEOS Working Group on Calibration and Validation (WGCV) established consensus within the international community that calibration, validation and quality assurance processes should be incorporated into satellite programmes in a harmonised way.

Through the session discussions, the workshop participants reached a consensus on a roadmap towards the establishment of Cal/Val best practices. These best practices will be issued as CEOS endorsed guidelines under the auspices of GEO for implementation by the agencies and will allow data to have an ascribed 'quality' associated with it. The guidelines will cover all aspects of the data quality from instrument characterisation to engineering calibration and geophysical validation.

Participants identified the need for a Cal/Val specific data policy and the allocation of the necessary resources through coordinated efforts of GEOSS members to allow the efficient implementation of these guidelines. Sufficient resources will be required to ensure the continued end-to-end operation and maintenance of a fully traceable Cal/Val system. The first step towards harmonisation across the global Earth Observation Cal/Val community is the development of a dedicated CEOS WGCV Cal/Val portal, which will facilitate the implementation of these activities on behalf of GEOSS.

*Source: ESA web-site*

### 3.7 UK TAKES OVER HELM OF INTERNATIONAL CHARTER

The British National Space Centre supported by Disaster Monitoring Constellation International Imaging Ltd have taken over the rotating six-month leadership of the International Charter 'Space and Major Disasters', a joint initiative by global space agency members to provide emergency response satellite data free of charge to rescue authorities responding to major natural or man-made disasters anywhere in the world.

"The UK is proud to lead this important group. We often think of space as being somewhere to explore, but it can also bring enormous benefits to us here on Earth," UK Minister for Science and Innovation Ian Pearson said. "By working together, the Charter's international partners are helping to save lives across the globe."

Satellite data can be of immense value to relief agencies in the identification and management of disaster events. As a consequence, ESA and the French space agency (CNES) initiated the Charter in 2000 to provide rush access to a broad range of satellite image data.

Following Charter activation, space-acquired data products and associated resources are made directly available to the civil protection agencies concerned. Services also include processing and interpretation. To date, the Charter has been activated more than 140 times.

The British National Space Centre (BNSC), as the representative of the multi-national Disaster Monitoring Constellation (DMC), will chair the Charter Board. UK company DMC International Imaging Ltd (DMCii), representing the DMC, will chair the Charter Executive Secretariat, which oversees the practical implementation of the Charter through the Partners. BNSC and DMCii take over the Chair from JAXA, the Japanese Space Agency.

Other Charter members currently include the Canadian Space Agency (CSA), the Indian Space Research Organisation (ISRO), the US National Oceanic and Atmospheric Administration (NOAA), the Argentine Space Agency (CONAE), the Japan Aerospace Exploration Agency (JAXA), the US Geological Survey (USGS) and the China National Space Administration (CNSA).

*Source: ESA web-site*

### 3.8 GREEKS GET SPACE-BASED HELP IN WAKE OF DEADLY FIRES

Cleanup and rebuilding teams responding to the devastation across Greece caused by this summer's deadly fires are getting help from space. A series of crisis map products based on satellite acquisitions of affected areas are being provided to aid damage assessment efforts following the activation of the International Charter on Space and Major Disasters.

More than 60 people were killed and thousands left homeless in the worst forest fires to hit Greece in decades. According to data from ESA's ERS-2 and Envisat satellites, which continuously survey fires burning across the Earth's surface with onboard sensors, Greece experienced more wildfire activity this August than other European countries experienced over the last decade.

In an effort to aid authorities responding to disasters such as this, ESA and other national space agencies established the International Charter on Space and Major Disasters in 2000 to provide rush access to a broad range of satellite data.

The Charter, activated by the Department of Emergency Planning and Response of the Greek Civil Protection Agency, processed this request and recruited the German Aerospace Centre (DLR) and the Strasbourg-based rapid mapping specialist company (SERTIT) to produce the maps using satellite images provided by the space agencies.

As a result, the Greek Civil Protection Agency received a series of Earth Observation (EO)-based crisis/damage mapping products generated using a variety of EO sensors. The first EO-based maps, delivered while the fires were still active, were overview products based on the Medium Resolution Imaging Spectrometer (MERIS) instrument aboard ESA's Envisat satellite. French and German Civil Protections active in Greece to support fire fighting teams also received the maps. These maps were used for fighting active fires across Greece, particularly those in the region of the Parnonas Mountains, which rise to almost 2000 metres on the eastern side of the Peloponnese peninsula that makes up southern Greece.

"These map products proved to be very helpful for managing the severe fires that Greece suffered," Fivos Theodorou, Director for Emergency Planning and Response of the General Secretariat for Civil Protection, said. "The General Secretariat for Civil Protection intends to use these maps for post-fire management purposes, such as burnt area mapping, reforestation and the construction of flood prevention projects and supply them to the Greek authorities, such as the Greek Forest Service, responsible for consequence management."

DLR performed this service under the scope of the Risk-EOS service network. Risk-EOS, part of ESA's initial Services Element of Global Monitoring for Environment and Security (GMES), offers EO-based operational services for rapid mapping of major disasters as well as other geo-information services to support risk management of hazards such as floods and forest fires.

The Risk EOS service network and its Greek partner, National Observatory of Athens (NOA), are now working closely with Greek authorities to consolidate further the work done by the Charter on the affected areas.

Other satellites used to produce the maps include NASA's Landsat operated by USGS, Nigeria-Sat-1 of the DMC satellite constellation, the SAC-C (an international cooperative mission between NASA and the Argentine Commission on Space Activities (CONAE), CNES, the Brazilian Space Agency, the Danish Space Research Institute and the Italian Space Agency), CNES's SPOT satellite and Taiwan's FORMOSAT satellite.

Other Charter members currently include the Canadian Space Agency (CSA), the Indian Space Research Organisation (ISRO), the US National Oceanic and Atmospheric Administration (NOAA), the Argentine Space Agency (CONAE), the Japan Aerospace Exploration Agency (JAXA), the British National Space Centre/Disaster Monitoring Constellation (BNSC/DMC), the U.S. Geological Survey (USGS) and the China National Space Administration (CNSA).

To learn more about the Charter, including past and recent activations, visit the Charter website:

[http://www.disasterscharter.org/main\\_e.html](http://www.disasterscharter.org/main_e.html).

Source: ESA web-site

### 3.9 FLOODS AND FIRES ACROSS EUROPE CAPTURED FROM SPACE

Highlighting the extreme weather conditions hitting Europe, space sensors aboard ESA's Envisat satellite have detected the worst floodwaters to hit Britain for 60 years and deadly fires raging through southern Europe. Heavy rains caused the River Thames to burst its banks on Wednesday, forcing the evacuation of hundreds of homes in Britain's university city of Oxford. The flooding across England and Wales has left tens of thousands without electricity and water.

The Environment Agency still has three severe flood warnings in place – two on the Thames around Oxford and one on the Ock River near Oxfordshire. In areas where flooding is beginning to recede, sanitation officials are warning of health risks posed by stagnant waters. Flooding is estimated to be the world's most costly kind of natural disaster. The flooding of June and July in the UK is expected to cost the insurance industry at least £2 billion, according to the Association of British Insurers (ABI). Floods Minister John Healey said recovery and clean-up efforts could take a number of months.

One of the biggest problems during flooding emergencies is obtaining an overall view of the phenomenon, with a clear idea of the extent of the flooded area. Aerial observation is often very difficult due to prohibitive weather conditions and, if the phenomenon is widespread, would be very time-consuming and expensive.

With inundated areas typically visible from space, Earth Observation (EO) is increasingly being used for flood response and mitigation. In October 2000, ESA and the French space agency (CNES) initiated the International Charter on 'Space and Major Disasters', a joint initiative for providing emergency response satellite data free of charge to those affected by disasters anywhere in the world. On 24 July, the UK Environment Agency requested the aid of the Charter.

#### *Heat and fire*

While Britain fights floods, southern European countries are battling blazes and searing temperatures that have surpassed 40 degrees Celsius, spawning fires in Greece, Italy and F.Y.R.O.M.

Fire fighters battled some 1500 blazes within a 24-hour period in parts of central and southern Italy over the weekend. On Tuesday in Italy's southern region of Puglia, thousands of tourists fled to beaches to escape a fast-burning fire and had to be rescued via boats and helicopters. Local media reports two elderly locals were killed trying to escape the flames.

On Thursday, fires continued to rage across Calabria and Abruzzo as strong winds thwarted fire-fighting efforts. According to the environmental group WWF, at least 4500 hectares of protected areas have burned in the past three weeks in Italy, with the hardest hit areas being Campania, Abruzzo, Calabria, Sicily and Puglia. Although searing temperatures and tinder dry conditions are to blame for some of the fires, on Wednesday Italian politicians and forestry officials blamed some on arsonists.

On Thursday some 200 fires were reported burning across Greece, where temperatures have been as high as 45 C, with more than a dozen burning out of control. Peloponnese and the island of Cephalonia in the Adriatic off the peninsula's northwest coast are among the worst hit areas. Major fires are visible from space – satellites detect not only the smoke billowing from major conflagrations but also the burn scars left in their wake and even the fires themselves – appearing as 'hotspots' when scanning the Earth's surface in infrared wavelengths.

For a decade now, ESA satellites have been continuously surveying fires burning across the Earth's surface. Worldwide fire maps based on this data are now available to users online in near-real time through ESA's ATSR World Fire Atlas (WFA). The WFA data are based on results from the Along Track Scanning Radiometer (ATSR) instrument onboard ESA's ERS-2 satellite and the Advanced Along Track Scanning Radiometer (AATSR) onboard Envisat. These twin radiometer sensors work like thermometers in the sky, measuring thermal infrared radiation to take the temperature of Earth's land surfaces.

*Source: ESA web-site*

### 3.10 CAMPAIGN PREPARES FOR FUTURE LAND-SURFACE MONITORING

Initial results from an extensive ESA field campaign, which is being carried out in support of the development of the GMES Sentinel-2 mission and the candidate Earth Explorer FLEX mission, prove encouraging and could pave the way for future monitoring of the Earth's surface.

Since one of the most important aspects of developing an Earth-observation (EO) mission is to make sure the eventual data meets the users' exacting requirements, huge efforts are put into field activities to evaluate the future performance of an instrument. This current campaign, called CEFLES2 (CarboEurope, FLEx and Sentinel-2), combines field experiments for two EO missions - Sentinel-2, which is being developed by ESA as part of the space segment for the GMES (Global Monitoring for Environment and Security) programme, and the candidate Earth Explorer FLEX mission.

Sentinel-2 is a multi-spectral imaging mission for high-resolution observation of land surfaces. It will provide an enhanced continuity of the French SPOT (Satellite Pour l'Observation de la Terre) missions and the US Landsat missions. As part of GMES, Sentinel-2 will provide information for land monitoring and emergency services.

The main aim of the FLEX mission concept is to make novel global observations of photosynthesis through the measurement of chlorophyll-fluorescence, which would lead to a better knowledge of the role vegetation plays in the Earth's carbon and water cycles, and ultimately contribute to an improved understanding of climate.

In support of these two missions, the CEFLES2 campaign is exploiting the synergies between a large collection of measurements of different types of vegetation taken from the air and on the ground. The campaign is being carried out in coordination with CERES (CarboEurope Regional Experiment Strategy), and includes participants from Germany, Italy, France, Spain and the Netherlands.

The main campaign site is located within the CERES experimental area in Gascony in south-west France, with additional airborne acquisitions taken over Madrid and the Mediterranean coast. The first measurements were taken in April and June

2007 and another set will be taken in September, so that different stages of crop growth are represented. The aim is to obtain reference datasets to address the specific needs of the development activities for Sentinel-2 and the FLEX candidate mission.

For Sentinel-2, the objective is to collect quality and coordinated airborne optical and in-situ measurements. Luis Alonso from the University of Valencia, Spain, coordinator of the ground team during the June campaign, said: "Hundreds of kilometres of airborne imagery over many types of landscapes have been acquired along with a complete set of ground measurements taken by a consortium of European laboratories. This campaign's unique dataset will be a major contribution for defining algorithms for Sentinel-2 and for testing the new data processing techniques that are needed for this satellite."

Uwe Rascher from the Jülich Research Centre, who is responsible for coordinating the ground measurements for FLEX, explained: "With this campaign we are taking the first steps to develop a measuring tool to monitor vegetation fluorescence that will allow us to observe the capacity of photosynthesis of plant ecosystems in real time, and to better manage plant ecosystems under future climate scenarios."

So far the campaign is proving very successful. Scientists are looking forward to the third part of the campaign in September, after which the results can be fully analysed. These results will further the development of the Sentinel-2 mission and the assessment studies for the candidate FLEX mission.

*Source: ESA web-site*

### 3.11 NASA EXAMINES ARCTIC SEA ICE CHANGES LEADING TO RECORD LOW IN 2007

PASADENA, Calif. - A new NASA-led study found a 23-percent loss in the extent of the Arctic's thick, year-round sea ice cover during the past two winters. This drastic reduction of perennial winter sea ice is the primary cause of this summer's fastest-ever sea ice retreat on record and subsequent smallest-ever extent of total Arctic coverage.

A team led by Son Nghiem of NASA's Jet Propulsion Laboratory, Pasadena, Calif., studied trends in Arctic perennial ice cover by combining data from NASA's Quick Scatterometer (QuikScat) satellite with a

computing model based on observations of sea ice drift from the International Arctic Buoy Programme. QuikScat can identify and map different classes of sea ice, including older, thicker perennial ice and younger, thinner seasonal ice.

Between winter 2005 and winter 2007, the perennial ice shrunk by an area the size of Texas and California combined. This severe loss continues a trend of rapid decreases in perennial ice extent in this decade. Study results will be published Oct. 4 in the journal *Geophysical Research Letters*.

The scientists observed less perennial ice cover in March 2007 than ever before, with the thick ice confined to the Arctic Ocean north of Canada. Consequently, the Arctic Ocean was dominated by thinner seasonal ice that melts faster. This ice is more easily compressed and responds more quickly to being pushed out of the Arctic by winds. Those thinner seasonal ice conditions facilitated the ice loss, leading to this year's record low amount of total Arctic sea ice.

Nghiem said the rapid decline in winter perennial ice the past two years was caused by unusual winds. "Unusual atmospheric conditions set up wind patterns that compressed the sea ice, loaded it into the Transpolar Drift Stream and then sped its flow out of the Arctic," he said. When that sea ice reached lower latitudes, it rapidly melted in the warmer waters.

"The winds causing this trend in ice reduction were set up by an unusual pattern of atmospheric pressure that began at the beginning of this century," Nghiem said. The Arctic Ocean's shift from perennial to seasonal ice is preconditioning the sea ice cover there for more efficient melting and further ice reductions each summer. The shift to seasonal ice decreases the reflectivity of Earth's surface and allows more solar energy to be absorbed in the ice-ocean system.

The perennial sea ice pattern change was deduced by using the buoy computing model infused with 50 years of data from drifting buoys and measurement camps to track sea ice movement around the Arctic Ocean. From the 1970s through the 1990s, perennial ice declined by about 500,000 square kilometers (193,000 square miles) each decade. Since 2000, that amount of decline has nearly tripled.

Results from the buoy model were verified against the past eight years of QuikScat observations, which have much better

resolution and coverage. The QuikScat data were verified with field experiments conducted aboard the U.S. Coast Guard icebreaker Healy, as well as by sea ice charts derived from multiple satellite data sources by analysts at the National Oceanic and Atmospheric Administration's National Ice Center in Suitland, Md. The new study differs significantly from other recent studies that only looked at the Arctic's total sea ice extent. "Our study applies QuikScat's unique capabilities to examine how the composition of Arctic sea ice is changing, which is crucial to understanding Arctic sea ice mass balance and overall Arctic climate stability," Ngheim said. Pablo Clemente-Colón of the National Ice Center, Suitland, Md., said the rapid reduction of Arctic perennial sea ice requires an urgent reassessment of sea ice forecast model predictions and of potential impacts to local weather and climate, as well as shipping and other maritime operations in the region. "Improving ice forecast models will require new physical insights and understanding of complex Arctic processes and interactions."

Other organizations participating in the study include the University of Washington's Polar Science Center, Seattle; and the U.S. Army Cold Regions Research and Engineering Laboratory, Hanover, N.H.

Media also may contact: Sandra Hines, University of Washington, 206-543-2580; Marie Darling, U.S. Army Cold Regions Research and Engineering Laboratory, 603-646-4292; Lt. James Brinkley, National Ice Center, 301-394-3018; and Peter Weiss, American Geophysical Union, Washington, 202-777-7507. For more information about QuikScat, visit:

<http://winds.jpl.nasa.gov/missions/quikscat/index.cfm>.

Source: JPL web-site

### **3.12 AMAZON FOREST UNREPENANTLY RESILIENT TO DROUGHT**

The extensive forests of South America's Amazon are turning out to be tougher than expected when it comes to withstanding the onslaughts of a changing climate. A team of U.S. and Brazilian scientists using the insightful eyes of two NASA satellites has shown that one of the worst droughts in decades could not stop the undisturbed

regions of the Amazon forest from "greening up."

The Amazon drought of 2005 reached its peak just as the region's annual dry season was beginning, from July through September. Although the double whammy of the parched conditions might be expected to slow the growth of the forest's leafy canopy, in much of the drought-stricken areas the canopy became significantly greener -- an indication of increased photosynthetic activity.

The new finding contradicts a prominent global climate model that predicts the Amazon forest would begin to "brown down" after just a month of drought. The model also predicts an eventual forest collapse, shifting the ecosystem permanently from a thick, evergreen, broad-leaved forest to a grassy savannah.

The researchers and their colleagues already knew the Amazon forest took advantage of the annual dry season's relatively cloudless skies to soak up the sun and grow. From a previous study that used NASA satellite data combined with additional field measurements, the researchers found that intact Amazon forest increases photosynthesis, actually "greening up," during the dry season.

The severe 2005 drought and the detailed, long-term observations from two NASA satellites -- one that maps the greenness of vegetation, one that measures rainfall in the tropics -- gave the researchers what they needed to see how the Amazon forest responds to a major drought.

One of the instruments on NASA's Terra satellite, launched in 1999 -- the Moderate Resolution Imaging Spectroradiometer, or MODIS, -- provides month-to-month maps of changes in vegetation status across the Amazon (and the world). The one-of-a-kind Tropical Rainfall Measuring Mission spacecraft, launched in 1997, collects observations of rainfall.

The scientists used the seven-to-nine years of observations from these satellites to map "normal" rainfall and greenness conditions in non-drought years. When they compared those conditions to the same months of the 2005 drought, the researchers found that areas of Amazon's intact forests that had received below-normal rainfall in 2005 also had above-average greenness.

Global climate models predict the Amazon forest will cut back photosynthesis quickly when a drought starts. That slowdown in plant growth would create a positive feedback loop: as the forest shuts down more and more, it removes less and less carbon dioxide from the atmosphere. The carbon dioxide ordinarily sequestered by growing trees would remain in the atmosphere, increasing global warming and further accelerating the forest's decline and additional carbon-dioxide-fuelled warming.

By contrast, the research team's findings suggest the opposite happens, at least in the short-term. The drought-induced flush of forest growth would dampen global warming, not accelerate it. During the 2005 drought, Amazon forest trees flourished in the sunnier-than-average weather, most likely by tapping water sources deep in the forest soil. To grow, trees must take up more carbon dioxide, thus drawing down the levels of atmospheric carbon dioxide.

For more information, visit:

<http://earthobservatory.nasa.gov/Study/AmazonEVI/>

[http://www.nasa.gov/centers/goddard/news/topstory/2006/amazon\\_crops.html](http://www.nasa.gov/centers/goddard/news/topstory/2006/amazon_crops.html)

<http://science.hq.nasa.gov/earth-sun/science/carbon.html>

<http://modis.gsfc.nasa.gov/>

<http://trmm.gsfc.nasa.gov/>

<http://lba.inpa.gov.br/lba/>

Source: *Earth Observatory web-site*

## 4. FEATURE ARTICLES

### Does Remote Sensing have a future, or are we wasting taxpayer's money?

Remote Sensing, as a term, was coined in about 1972, reflecting the evolution of an approach to technology that had been around for a long time; after all divining rods have been used to detect underground water for many hundreds or even thousands of years. But this evolution; the advent of spaceborne sensors detecting electromagnetic radiation and the subsequent extraction of information from this data, seems to be stagnating.

Stagnating??, you might query; well let us have a look at the situation.

The purpose of Remote Sensing is to acquire information, not data, and this process of converting the image data into information can be categorised into three major components or stages;

**Classification** or "What are we looking at?"

**Estimation** or "What is its condition?"

**Temporal Analysis** or "How does it respond to its forcing mechanisms?"

Of these, the first two have been a major focus for research, development and application since the early 70's. The third was also recognised as having major potential benefits at the same time period, but has only relatively recently taken on a life of its own, largely because of the lack of suitable time series of image data. Let us consider the first two of these in turn, since they are the two that have been around for some time, and so we have a history from which we might learn something useful.

**Classification** started with three alternative ways to partition the image data into land cover or land use classes; maximum likelihood classification, parallelepiped classification and lookup table classifiers. Despite the development of many classifier algorithms since then, Maximum Likelihood Classification remains the tool of choice for most classification tasks conducted to this day. Yet today, we achieve accuracies that are hardly better than they were when we started; 65% to 90% accuracies depending primarily on the imagery used and the classes being discriminated. This is despite that fact that we are well aware that courts of

law will only accept this type of information, for example topographic maps, if it can be shown that the information has an accuracy level of 95% or better. As a consequence, information produced by remote sensing techniques is often used as the servant to other techniques that will be accepted in a court of law, such as the field visit. And we seem to accept this situation, despite the fact that it places our technology in the category of "Nice to have" rather than "Essential". In addition to this, if one examines this classification model, one soon realises that we train the classifier on a selection of data, and then on the assumption that other areas with similar response values are of the same class, classify all of the pixels in the image despite the fact that we know that this assumption is not always true. What is worse, the classifier does not tell us when this assumption is being violated; that is we cannot tell from the classification result itself, whether the results are good or poor. Essentially we are using methods of extrapolation, even though we know, from Statistics 1 at University, that extrapolation is a very risky method to use.

If remotely sensed data was used in techniques that would provide information that would stand on its own in a court of law, then the way this technology would be viewed by the resource management community would change dramatically. This change would then drive significant changes in the way resources were managed. So, for example, if the EU based Control Projects in the individual member states of the EU, designed to check farmer applications for a subsidy, could use remote sensing as the primary source of legally acceptable information, then national governments could remove the need for field visits whilst the crops are still in the ground; removing a cost to the system and removing some of the pressure on the current system to produce results relatively early in the season. With crops, the most reliable period in which to acquire images is during the harvest, for obvious reasons; yet this window is closed to the current system as the legally acceptable evidence from field visits requires that those field visits be conducted whilst the crops are

still in the ground. So, there is a desperate need to develop classification methodologies that achieve standards of accuracy that will be accepted in a court of law. In addition to this, if one uses extrapolation, then one never knows when errors may occur; there is thus the need to move classification away from extrapolation and towards an alternative, such as interpolation.

**Estimation** is usually conducted by deriving an empirical relationship between the image data and the physical parameters that are to be estimated, and then using this relationship over either a more extensive area or more intensively to fill in between the observations used to derive the relationship. Now we know that Estimation can only work if the image data are internally consistent; yet methods of reliably and routinely correcting the image data for atmospheric effects are still not in place. There are few satellites, for example, that can acquire image data and simultaneously acquire data that will allow for the correction of the data for atmospheric effects. Such data are hardly required for the stable constituents in the atmosphere as numerical models are quite satisfactory for their correction; but such models are totally unsatisfactory for the spatially and temporally dynamic components, such as water vapour and aerosols, simply because these models do not know about the magnitude of this variability. Techniques have been developed to estimate the water column from a moisture absorption band and its shoulder wavebands; why do current satellites being launched not automatically include these bands in their suite of acquired data? Aerosols are more difficult, and I suspect will remain so, because the reflectance characteristics of the aerosols depends on their coating materials at the time, and these can change just as the size of the aerosols particles and their moisture levels can also change with time. It would seem that we need to build alternative strategies to deal accurately with aerosols.

But whilst this might be the conventional way to conduct Estimation in remote sensing, it is not the conventional way that Estimation was conducted prior to remote sensing, or in other disciplines. The conventional way to conduct Estimation is to acquire a distribution of point observations and then complete the mapping by the use of linear interpolation. If we actually use the image data to derive estimates of the physical parameters, and then use these estimates with point observations of the parameters, then we can

integrate the mapping with the point observations into a kriging process so as to map the parameters across the whole area, and this would, almost certainly provide better results than either the conventional way to map attribute resources or to conduct Estimation in remote sensing.

What can we learn from this analysis? The first observation that one can make is that remote sensing research started by looking for empirical relationships that could be used in classification and estimation. Then, when it was found that empirical relationships are not reliable outside of the study used to derive them, the reaction was to try and derive deterministic relationships. This direction led to the development of a number of very complex deterministic models, all of which are far too complex to be able to invert, so as to estimate the physical parameters from the image data, and so was borne the third general direction of deriving quasi-deterministic simplifications of the deterministic models.

But there are other strategies that could have been employed. The first is to move away from the goal of having the remotely sensed data give us all of the information to a strategy of accepting that the remotely sensed data needs to be integrated into a much more broadly based and richer system of data and information, so that the suite of data used provide internal checks, and can be used in complimentary ways to derive the required information. Other forms of complimentary data and information that we have includes field data, local and disciplinary knowledge and their associated databases; these should be integrated with the image data in a system that uses all of them; and which accepts that all of them contain errors.

The second strategy is to also accept that information derived from remotely sensed data can contain unacceptable errors; errors that arise because the image data portrays something that is way out of synchronisation with our perceptions of reality. Thus a tractor on a field, or short term flooding can result in image data that is quite different to what one might expect from a field crop, the nominal use to which that field might be put, just as the movement of the canopy due to wind can dramatically change the response in the field, dramatically affecting Estimation of crop status in the field. One way to protect the system from these quasi-random effects is to use the data in an incremental way, with checks imposed on it at each incremental

step. These checks may force the adjustment of the information derived from the remotely sensed data so that it conforms with other forms of data and information that are in the system.

So, where lies the core of the problem and how do we find a solution.

Firstly, I believe that we, too much, take that this discipline as being an applied discipline and not having a scientific basis in its own right. Certainly the acquisition of the data is based on existing disciplines of physics, information theory, mathematics and statistics. But that tools we have taken from these disciplines has not achieved satisfactory results suggests to me that there might well be a body of scientific knowledge directly related to the analysis and extraction of information from image data that has not yet been properly identified and exploited.

Secondly, those involved in the extraction of information from the data, faced with a problem in their analysis, invariably search for a solution in the analysis, whereas the optimum solution might well reside external to this analysis; for example it might reside in how we collect the data, how we conduct the analysis or in how we use other forms of data, including field data and local knowledge. The pre-processing of the data is a case in point, where this should all be done at the supplier's end of the chain, rather than

having the analysts trying to do something with inferior data at the analysis end. I believe that the current power bases of the data suppliers means that they pay inadequate attention to the end users and their associated analysts in the design and development of satellite systems. If data providers were paid for information derived from the data rather than for the supply of data, then they would become much more concerned with meeting the needs of the user and the intermediate analysts. In 2007 we should not be debating the correction and calibration of data; this should all have been routine for at least ten years. So, if the EU paid for their image data as a function of the quality of the derived information, for example in terms of its accuracy, then I believe that we would see a sharp change in the attitude of the data suppliers.

Thirdly, I think that the analysis needs to think a lot more about associated data and information that can be routinely integrated into the analysis chain, and accepting that this is essential even though each form of data or information contains errors.

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## Bringing together the multidisciplinary scientific community addressing desertification issues: The European DesertNet Initiative (EDN)

### DESERTIFICATION, A SERIOUS WORLDWIDE CONCERN

**Desertification** is a severe degradation of land induced by complex coupling between economic agents activity and natural factors in arid, semi-arid and sub-humid regions. Presently, 39,2 % (about 5.2 billion hectares) of the world are under threat, which brings vulnerable local people to extreme poverty situations. It may lead to massive human displacement, which only becomes internationally visible when cross-boundary migrations take place. Migrations can not only generate economic problems to other regions but also frequently generate national and international tensions. Some 900 million people are estimated to be under threat – a figure that could rise to over 2 billion

people by around 2050. This unacceptable situation has brought a wide international solidarity move. The most visible event is the UNCCD declaration (United Nations Convention to Combat Desertification), which was adopted in Paris on June 17, 1994 and entered into force on December 26, 1996. Countless more modest initiatives started and are developing so far. European DesertNet (EDN) can be seen as a '*bottom-up*' concerted contribution of European scientists to that international effort. Due to immense worldwide interest of the scientific community, European DesertNet since December 2006 allows membership of non-European scientists, specifically inviting scientists from affected countries to join the network. The EDN aims at identifying cutting-edge science and

transferring scientific knowledge generated in the research projects of the EDN members to end user organizations as well as providing mechanisms to evaluate the on going policies to combat desertification from the economic and scientific point of view.

The main origin of desertification is the overexploitation of scarce natural resources beyond their recovery point, often deepened by such natural conditions as climate fluctuations at various time and space conditions scales. Frequently, the origins of the process are the lack of internalization of the negative externalities of several economic activities developed in the fragile ecosystems area. Combating desertification requires a scientific interdisciplinary approach, to understand the origins of the phenomena and best anticipate the impacts of mitigation or remediation measures – including identification and protection of endangered areas. For these reasons, the present research programmes tend to increase the integration of data and processes about soil, plant and water degradation to various social and economic factors.

Underlying strategies include such various and interacting themes as water efficient management, introduction of species resistant to dryness conditions, better management of land productivity, stopping irrigated lands losses, demography, local micro-economic measures. They imply both a long-term situation global monitoring and a specific focus on endangered areas or zones under mitigation and remediation measures. Taking a joint advantage of remote sensing multi-scale time series of remotely sensed products with in situ various data collected according to strict protocols is expected to bring a unique tool to answer this dramatic challenge.

#### **INTERNATIONAL ORGANIZATIONS AND CIVIL SOCIETY**

International organizations have been politically endorsed worldwide. Their deep willingness and commitment to lead their mission to the benefit of the most vulnerable populations is by no ways questionable, but efficiently harmonizing this 'top-down' approach with an actual participation of the civil society such as local population, local managers, NGO's, scientists, servicing structures, private sector, etc, may show quite challenging. Nevertheless, joining the 'bottom' and the

'top' is mandatory to get efficient and sustainable achievements. Actually, many 'bottom-up' initiatives are flourishing and are needed to build success stories. Most often, they tend to build up dedicated intermediate structures that can efficiently build up a common language for a better interaction between the 'bottom' and the 'top'. EDN can be perceived as one of them. Desertification is not just a theoretical scientific approach but also an applied know-how to design policies. Most scientists involved in desertification research are in close contact with interactions between hard environmental conditions and people who are fighting to survive. The human sense of solidarity and the scientific understanding of the needs of multidisciplinary research at an ambitious level can explain why scientists decided to join their efforts through the EDN structure and its associated worldwide network. EDN is also willing to contact economic agents that work in mitigation and remediation projects or are affected by desertification consequences of the desertification process like insurance companies, infrastructure operators, farmer organizations, companies producing mitigations devices, and public administration at local and regional level in the affected areas.

#### **EDN: A SHORT STORY**

The beginning of the story is a German initiative, when national researchers about desertification issues decided to join their efforts through a dedicated scientific network - 'Desert\*Net Germany' ([www.desertnet.de](http://www.desertnet.de)).

During the CRIC-3 meeting of the UNCCD (May 2 to 11, 2005, Bonn, Germany), Desert\*Net Germany representatives informally met with scientists from the CSFD (France) and the BELSPO (Belgium). They decided to enlarge the German initiative to the European scale. A Declaration summarized hereunder was compiled and opened for signature. This Declaration and registration facilities can be found on the official EDN Website at <http://www.european-desertnet.eu/>.

The foundational meeting of EDN took place on October 16 and 17 2006 in Bonn, Germany, within the premises of UN which host the UNCCD Secretariat. The aims and structure of the network were formulated. A total of 38 scientists from 8 countries, UNCCD/CST, the European Commission (DG Research and DG Joint

Research Centres), UNESCO/MAB and representatives of European ministries were present.

The first working meeting of European DesertNet took place in January 2007 in Brussels, Belgium. The worldwide vocation of EDN was firmly stated. Working topics and five working groups were defined. Representatives of OASIS, a global agricultural research-for-development partnership against desertification project, joined the "users group". Also, "Drynet", an EU co-financed international initiative against drylands degradation and poverty of 14 non-governmental organizations (NGOs) from all over the world: Africa, Asia, Latin America and Europe, joined the "users group". So, EDN went online. The network went on growing and significantly spreading outside the EU. On July 16, 2007, the network included 220 members from 36 countries. Since mid July 2007, discussions are underway with relevant networks in China. Scientists and representatives of scientific networks in China have signalled much interest in joining European DesertNet. A joint Memorandum of Understanding between Chinese and European DesertNet will be formulated.

#### **EDN: THE PRINCIPLES OF A SHARED WILLINGNESS AND OBJECTIVES**

The **major objectives** of EDN are:

- To identify and analyse the pressing problems with regard to drought, land degradation/desertification and poverty;
- To review the state of the art of European scientific knowledge and know-how concerning this global problem;
- To identify, through networking, success stories and best practices resulting from scientific research, and to create multipliers and accelerators for their implementation;
- To identify gaps and develop innovative basic research in these areas;
- To develop applied research in view of its use in arid, semi-arid and dry sub-humid areas, thereby focusing on users' needs, interdisciplinarity and integration;
- To strengthen and support European research capacities in order to promote scientific cooperation;
- To structure and facilitate the communication and transfer of know-how and technologies within the European DesertNet and towards affected countries;

- To establish and intensify linkages with research partners inside and outside Europe;
- To stimulate application of appropriate research findings in the drylands through participatory processes, involving civil society, NGOs and CBOs;
- To establish a mechanism for effective and successful policy advice and for public awareness rising.

As a **network**, EDN

- provides a platform for scientific discussions and exchange of ideas, foster cutting edge science, identify topics and research areas,
- identifies and documents scientific state of the art of the main topics in desertification assessment, risk evaluation, mitigation and restoration,
- identifies and articulates the economic drivers and the socio-economic consequences of desertification,
- integrates scientific findings across disciplines, translate into common language and communicate scientific findings, and
- works in and on affected areas inside and outside Europe.

As a **think tank**, EDN communicates with stakeholders and policy-makers. EDN

- identifies minimum consensus on consolidated knowledge,
- evaluates scientific knowledge for stakeholders and policy makers,
- disseminates knowledge,
- responds to demands for assessment and information needs address knowledge gaps,
- translates knowledge to improve governance,
- and identifies issues and priorities for stakeholders and public policies.

For this purpose, EDN - basically a European initiative - is open to all scientists within and outside Europe wanting to join it and collaborate with it. EDN supports the UN environmental conventions, in particular the UNCCD. It intends to strengthen the cooperation with its scientific body, the Committee on Science and Technology (CST) and is open to collaborate with all other UNCCD panels or groups, in need of scientific input. EDN is also looking forward to collaboration with international organisations, programmes and agencies in

need of scientific information or advice. EDN is firmly based on the idea of creating a **global network of scientists** who are interested in the topic and who share the vision and the objectives delineated in the Declaration of the European DesertNet. **So, it is open to all scientists in the world.** EDN is prepared to put its knowledge its understanding to the service of combating desertification and creating sustainable livelihoods in drylands through sound scientific work.

#### THE PRESENT EDN STRUCTURES

EDN is led and coordinated by a **Chair**: Prof. Dr. Carlos San Juan Mesonada, University Carlos III of Madrid, Spain) and a **Co-Chair & Secretary** (office leader): Dr. Mariam Akhtar-Schuster (University of Hamburg, Germany).

The operational managing structure is the **'Steering Committee'**, supported by an **'Advisory Board'** which, among others, is the contact point for the various research communities, leads a survey paving the way to innovative approaches and programmes.

The **'Users Group'** is an EDN key structure. It can be written that, without efficient contact with local population, decision-makers, NGOs, EDN cannot achieve its ultimate goals. As mentioned above, the OASIS project and the DRYNET NGOs network are the first members of the **'Users Group'**, which should expand further on.

In order to lead and structure the practical day-to-day work and structure it, five strongly interacting **'Working Groups' (WG)** have been set up:

- The **'Science-Policy Interface' WG** (chaired par Dr. Gérard Begni), is in charge of addressing needs and demands articulated by policy makers
- The **'Drylands Observation System' WG** is in charge of taking into account the space observation systems and the multidisciplinary in situ measurement network in order to set up integrated sustainable observation systems that meet the needs of scientists and of all those who take advantage of the information that they can elaborate from them, either for early warning system, prevention or mitigation measures and efficiency evaluation. This WG is certainly the main interface between EARSel and EDN

- The **'Economic Drivers and Social-Economic Consequences' WG** is in charge of taking into account these issues which are quite important for integrated approaches and stakeholders dialogue among others.
- The **'Internal Structures' WG** group is eliciting funding mechanisms of the network, and is organising the preparation of key events
- The **'Training and Capacity Building'** (chaired by Pr. Dr. Stefano Grego) is also a key structure to improve and strengthen the "downstream" dialogue and sustainable action definition and proper leading. Underestimating the training and capacity building needs and failing to properly target the related activities would be a major mistake in EDN work plan.

#### A SHORT INSIGHT ON PRESENT ACTIVITIES AND PROJECTS.

The EDN started working as soon as its objectives and structures were endorsed and consolidated.

A **questionnaire about immediate expectations** from EDN was developed and carried out by M. José Marqués Pérez. The most important issue is the necessity and the possibility of **setting up working groups**, not only in the figure itself but also in the low deviation of the opinions. The second issue in importance is the **spreading of information** (communication with the general public is considered essential). The figure presented hereunder is the best illustration of these results:

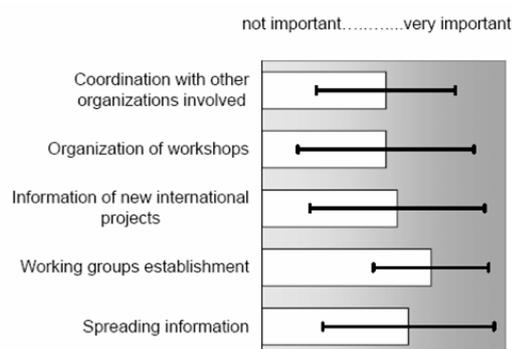


Fig. 1 – Results of the EDN immediate expectations questionnaire.

The **'Science-Policy Interface' WG** has received an official ministerial official request to comment the 10-Year Strategic

Plan and Framework to Enhance the Implementation of the UNCCD (2008-2018), and is currently also commenting on the GoE document on «Communication and information Strategy». Moreover, this WG will organize a side event during the UNCCD COP-8 in Madrid, Spain: *“Desertification: science, policy making and the chain of users. Is there a straightforward path from science to end-users? Where are the turning points and crossroads?”* (Sept. 4, 2007). This evidences a firm and trusty link between EDN and formal structures linked to the UNCCD.

**The ‘Drylands Observation System’ WG** is preparing a scientific lecture session and an internal working meeting which will take place on 6th and 7th September 2007 respectively in the framework of the Botanical Congress (September 3rd - 7th 2007) at Hamburg University, Germany.

So, while looking at the best way to answer the network expectations, EDN started working on both the political and scientific fronts.

#### **CONCLUSION: EDN and EARSeL**

EARSeL is the European Association of remote Sensing Laboratories. Remote Sensing can be considered as a technique in itself raising scientific questions of its own (especially when Remote Sensing is not limited to the observation of emerged lands), or requesting some generic research such as image processing techniques.

Nevertheless, the primary objective of Remote Sensing is to develop applications at large. For that reason, EARSeL was naturally led to organize itself into Special

Interest Groups (SIG). While some of them are technological, most of them are thematic (for instance Land Use and land Cover, Forest Fires, etc.). EARSeL is also a European initiative by no ways limited to European issues, since for instance it hosts a “Developing Countries” SIG.

EDN has some peculiar features that cannot be found in EARSeL, and vice-versa. EARSeL has a much larger field of thematic interests than EDN, while EDN recognizes the key role of remote sensing but has a wider field of scientific and ‘political’ interests. This explains why a network such as EDN is more than a SIG of EARSeL. Nevertheless, there is an important common part in EDN and EARSeL work, where leading common efforts and sharing common results can only be beneficial to both structures.

So, it should be acknowledged that EARSeL and EDN share a lot of principles, ideas and working topics in common. The gate is wide open to a mutually fruitful cooperation between the two organizations. A starting point can be seen in the presentation of EDN made by R. Escadafal (CESBIO/IRD, France), member of EDN Advisory Board and Drylands Observation Systems WG during the 27<sup>th</sup> EARSeL symposium in Bolzano, Italy. No doubt that this presentation will be the starting point of a long and fruitful cooperation.

Prof. Dr. Carlos San Juan Mesonada  
(Department of Economics, University  
Carlos III of Madrid, Spain)

Dr. Mariam Akhtar-Schuster (University of  
Hamburg, Germany)

Dr. Begni, G. (Cnes).

## 5. FUTURE EVENTS

### 5.1 28TH EARSEL SYMPOSIUM "REMOTE SENSING FOR A CHANGING EUROPE"

The 28<sup>th</sup> EARSel Symposium and Workshops will take place in Istanbul, Turkey on 2<sup>nd</sup> – 7<sup>th</sup> of June 2008. Presentations can be related to all fields of geoinformation and remote sensing, and especially to:

- Geoinformation and remote sensing
- New sensors and instruments
- Image processing techniques
- Data fusion
- Imaging spectroscopy
- Radar remote sensing
- Land use and land cover
- LIDAR
- Urban remote sensing
- Land degradation and desertification
- Hydrology, land ice & snow
- Coastal zone
- Forestry
- Agriculture
- 3D spatial analysis
- World heritage
- Time series analysis

In addition to these topics, a special session jointly held by ASTER and EARSel will take place during the symposium. Participants are encouraged to submit contributions dealing with the use of ASTER data in general and/or in particular focussing on ASTER Thermal bands.

Three workshops will run in parallel and after the end of the Symposium:

- 4th Workshop of the EARSel Special Interest Group on Developing Countries, in conjunction with GISDECO 8, 8th workshop of the GIS in Developing Countries network, "Integrating GIS and Remote Sensing in a Dynamic World" 4-7 June 2008
- 3rd Workshop of the EARSel Special Interest Group Geological Applications, focussing on seismic hazards, 6-7 June 2008
- 1st Workshop of the EARSel Special Interest Group Education and Training, 6 June 2008.

Due date for submission of abstracts: 15 December 2007.

Abstract submission via web interface available at: <http://www.earsel.org>  
Further details are available on the web: [www.earsel28.itu.edu.tr](http://www.earsel28.itu.edu.tr)

### 5.2 5TH WORKSHOP OF SIG REMOTE SENSING OF LAND ICE AND SNOW

The department of Geography of the University of Bern in Switzerland is hosting the 5<sup>th</sup> Workshop on Remote Sensing of Land Ice and Snow of EARSel, "Remote Sensing of Snow and Glaciers: Changing Climate – Changing Cryosphere". The workshop will take place on 11<sup>th</sup> – 13<sup>th</sup> of February 2008. The keynote presentations will be given by Prof. Hans v. Storch (Director of Institute for Coastal Research, GKSS and Professor at the Meteorological Institute of the University of Hamburg, Germany) and Dr. Mark Drinkwater (Head, Mission Science Division (EOP-SM), European Space Agency, ESTEC, Earth Observation Programmes, Netherlands). Presentations will cover all fields of environmental research with the focus on snow and ice as proxy for changing cryosphere, methods for retrieving cryospheric parameters from various types of remote sensing data, theoretical basis of inversion methods and their application, state of the art of retrieval algorithm, data assimilation of remote sensing data and in situ observations in process models, etc. The workshop also offers the possibility for sessions covering preparations of and results from field campaigns in mountainous and polar regions with special emphasis on IPY.

(<http://www.geography.unibe.ch/research/remotesensing.html>).

### 5.3 GLOBSNOW WORKSHOP 2008

The European Space Agency (ESA) will sponsor a user workshop related to global monitoring of snow, to be held at the University of Bern (Bern, Switzerland) scheduled on Thursday 14 of February 2008. The main objective of this user workshop will be to prepare user requirement guidelines for a possible future Data User Element (DUE) project "GlobSnow" competitively funded by ESA to promote global monitoring of Essential Climate Variables, of which snow cover is one, required by the GCOS implementation plan in support of the UNFCCC. More information on: <http://www.geographie.unibe.ch/lenya/giub/liv/research/remotesensing/Forschung/globsnow.html>

#### 5.4 EARSEL JOINT WORKSHOP "NEW CHALLENGES OF HIGH RESOLUTION REMOTE SENSING"

On 5<sup>th</sup> – 7<sup>th</sup> March 2008, the SIGs of Urban Remote Sensing, 3D Remote Sensing, Developing Countries and Radar Remote Sensing, are organising a joint Workshop in Bochum, Germany. The topic of the workshop is of mutual interest to these SIGs. Thus the workshop will have an integrative function to bring together people from different remote sensing branches to discuss their experiences and problems in dealing with high resolution data. High resolution data is a valuable source for urban and suburban areas and can deliver information in high geometric and semantic quality for various cities and urban agglomerations around the world. The first workshop of the EARSeL SIG "Urban Remote Sensing" in Berlin 2006 attracted approx. 130 participants. This is a strong indicator for the need of a follow-up workshop on the topic in conjunction with other SIGs dealing with high resolution data sets. The 1<sup>st</sup> workshop, aiming at "Urban Remote Sensing" with a focus on challenges and solutions, covered a large variety of topics, like:

- Urban patterns and processes
- Monitoring urban development
- Multi-scale retrieval of climatologically relevant urban-surface parameters from remote sensing data
- Comparing pixel- and object-based classification of imperviousness
- Remote sensing for megacities research
- Classifying segmented hyperspectral data from urban areas using support vector machines

Further information can be obtained by contacting the EARSeL Secretariat (Mrs Gesine Boettcher, see page 4 of this newsletter for contact details) or:

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#### 5.5 1ST INTERNATIONAL CONFERENCE ON REMOTE SENSING TECHNIQUES IN DISASTER MANAGEMENT AND EMERGENCY RESPONSE IN THE MEDITERRANEAN REGION

On its annual meeting, held in June 2007 in Bolzano (Italy), the *European Association on Remote Sensing Laboratories* (EARSeL) appointed Croatia to organise the *International Conference on Remote Sensing Techniques in Disaster Management and Emergency Response in the Mediterranean Region*. The Conference thematically refers to disasters caused by:

- forest fires
- earthquakes
- floods
- soil degradation
- landsliding and mudflows
- storm damage
- sea pollution (e.g. oil-spill detection, etc.)
- man-made and other relevant aspects

The Conference will be held from 22 to 24 September 2008 in Zadar (Croatia). The Conference organising institutions are:

- EARSeL
- Scientific Council for Remote Sensing Techniques and Photogrammetry at the Croatian Academy of Science and Arts (HAZU)
- University of Zadar
- GEOSAT Ltd., Zagreb.

The Conference is expected to provide an international forum, which will bring together experts engaged in remote sensing and GIS techniques, as well as those, dealing with disaster management. They all are invited to present and discuss their experiences and results achieved in the field of disaster risk reduction using new developing technologies and applications.

The Conference will cover several considerable aspects of risk management and reduction in emergency situations, such as knowledge, prevention, warning, management of emergency situations, post-crisis analyses, environmental rehabilitation, etc.

The organization of the Conference, including the exchange of new information and adoption of new methods from more developed countries, is of a great interest for

Croatia. As an illustration for this interest are disasters caused by forest fires that occurred last summer in Croatia, but also in many other countries of the Mediterranean region: dozens of people were killed in these fires and damage reported reaches as high as some billions of EURO. In addition, it should not be neglected the fact that Croatia is situated in the area characterized by increased seismic activity and therefore threatened by severe earthquakes.

We are inviting experts covering any topic of the Conference to take part in this meeting and contribute to its success.

Details referring to the Conference are available at <http://www.earsel.geosat.hr>

Prof. Marinko Oluić, Ph. D.  
President of the Organising Committee

## 5.6 INTERNATIONAL SUMMER SCHOOL IN ARCHAEOLOGY

The International Summer School in Archaeology is a well-established interdisciplinary event. These events represent an important occasion to establish contacts between experts in archaeology, cultural heritage, art history and experts from remote sensing, photogrammetry, CAD, spatial information science, computer graphics, virtual reality, etc. The School emphasizes international composition of the audience, extended discussions between participants and direct relationships between lecturers and students, which ultimately could lead to joint projects.

The School will be held in the congress centre Centro Stefano Franscini, Monte Verità, Ascona, Switzerland, from Friday 9<sup>th</sup> until Wednesday 14<sup>th</sup> of May 2008. Approximately 20 lectures will be given in English, to about 60 participants.

For more information please visit:  
<http://www.3darchaeology.org/>

## 5.7 SPATIAL ACCURACY 2008

The 8th International Symposium on Spatial Accuracy Assessment in Natural Resources and Environment Sciences June 25-27, 2008, Shanghai, China (<http://2008.spatial-accuracy.org>)

Contact: Jingxiong ZHANG (Organizing Committee):  
[accuracy2008@spatial-accuracy.org](mailto:accuracy2008@spatial-accuracy.org)  
Yong GE (Secretariat): [gey@lreis.ac.cn](mailto:gey@lreis.ac.cn)

### Important Dates:

Submission of extended abstracts:

January 12, 2008

Notification to authors: February 11, 2008

Submission of final papers: April 29, 2008

Early registration: April 29, 2008

Pre-symposium workshop: June 23 -24, 2008

## 5.8 10<sup>TH</sup> INTERNATIONAL SYMPOSIUM ON HIGH MOUNTAIN REMOTE SENSING CARTOGRAPHY

The Tenth International Symposium on High Mountain Remote Sensing Cartography (HMRSC X) will be held in Kathmandu, Nepal from 8-11 September 2008. The HMRSC X will cover diverse topics including remote sensing techniques, environmental studies, morphological mapping, monitoring of environmental and global change biodiversity, geology and mining, glacier and glacial lake investigations, ecotourism, mountain cartography, amongst others. These fields are direct applications of remote sensing techniques.

Deadline for submission of abstracts:

February 1, 2008

Notification of acceptance: April 1, 2008

Early registration deadline: May 1, 2008

Late registration deadline: June 1, 2008

Camera-ready paper: September 8, 2008

Symposium: September 8-11, 2008

Field Excursion: September 12-19, 2008

For further information, contact:

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Remote Sensing Specialist

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<http://menris.icimod.net/news/showdetail.php?id=193>

## 5.9 EUROCOW 2008

The International Calibration and Orientation Workshop EuroCOW 2008, will be held from January 30<sup>th</sup> to February 1<sup>st</sup> 2008 in Castelldefels, Spain. This meeting intends to bring together the world experts, both from public and private sectors, to present and discuss the recent findings and developments on Sensor Calibration and Orientation. **EuroCOW 2008** will be a highly specialized small forum to facilitate the circulation of useful and new information. The workshop is organized by the **Institute of Geomatics**, on behalf of the **EuroSDR** (European Spatial Data Research) Commission I and the **ISPRS** (International Society for Photogrammetry and Remote Sensing) Working Groups 3 and 4 of Commission I, and Intercommission Working Group 1 of Commission V. The topics that will be covered include:

- Calibration of digital cameras
- Calibration of LIDAR sensors
- Calibration of radar sensors
- Calibration and orientation of satellite sensors
- National and international controlled tests
- Algorithms for sensor calibration and orientation
- Systems for sensor calibration and orientation
- Procedures and methodologies for sensor calibration and orientation
- INS technology for sensor calibration and orientation
- Galileo and GPS technology for sensor calibration and orientation
- Orientation and Calibration of small satellite sensors

For more information visit:

<http://www.eurocow.org>

## 5.10 COSPAR 2008 "50TH ANNIVERSARY ASSEMBLY"

37th Scientific Assembly of the Committee on Space Research and Associated Events - COSPAR 2008 "50th Anniversary Assembly".

Scientific Program Chair:

Prof. Jean-Pierre St.-Maurice, University of Saskatchewan, Saskatoon, Canada

Abstract Deadline:

17 February 2008

Topics:

Approximately 95 meetings covering the fields of COSPAR Scientific Commissions (SC) and Panels:

- SC A: The Earth's Surface, Meteorology and Climate
- SC B: The Earth-Moon System, Planets, and Small Bodies of the Solar System
- SC C: The Upper Atmospheres of the Earth and Planets Including Reference Atmospheres
- SC D: Space Plasmas in the Solar System, Including Planetary Magnetospheres
- SC E: Research in Astrophysics from Space
- SC F: Life Sciences as Related to Space
- SC G: Materials Sciences in Space
- SC H: Fundamental Physics in Space
- Panel on Satellite Dynamics (PSD)
- Panel on Scientific Ballooning (PSB)
- Panel on Potentially Environmentally Detrimental Activities in Space (PEDAS)
- Panel on Radiation Belt Environment Modelling (PRBEM)
- Panel on Space Weather (PSW)
- Panel on Planetary Protection (PPP)
- Panel on Capacity Building (PCB)
- Panel on Education (PE)
- Special events: 50th anniversary lectures, interdisciplinary lectures, space agency round table, session on "EGY - Towards an Earth and Space Science Commons"

Selected papers published in *Advances in Space Research*, a fully refereed journal.

For more information visit <http://www.cospar-assembly.org> or <http://www.cospar2008.org/>.

## 5.11 FOREST FIRES 2008

### International Conference on Modelling, Monitoring and Management of Forest Fires

The conference is organised by: Wessex Institute of Technology, UK, and University of Castilla – La Mancha, Spain and aims to address all aspects of forest fires, from fire propagation in different scenarios to the optimum strategies for fire-fighting. It will also cover issues related to economic, ecological, social and health effects. The specific topics that will be covered include:

- Computer models for fire propagation
- Risk and vulnerability assessment
- Fire combustion models
- Computational methods and experiments
- Case studies
- Emergency response systems
- Optimization models for fire mitigation
- Environmental impact models
- Air pollution and health risk
- Interaction between meteorological and forest fires models
- Economic impact models
- Forest material characterisation
- Eco remediation models
- Decision support systems
- Monitoring systems
- Data acquisition and analysis

For more information visit:

<http://www.wessex.ac.uk/conferences/2008/fires08/index.html>

## 5.12 TOULOUSE SPACE SHOW

In 2008, France is hosting two major conferences - the European Navigation Conference – Global Navigation Satellite Systems (ENC-GNSS) and the European Forum for Time and Frequency (EFTF).

The key players in the Midi-Pyrenees region decided that these two gatherings (ENC-GNSS and EFTF) should be associated with an international symposium on Space Applications and an exhibition covering all application domains, in Toulouse, a worldwide centre of excellence in this field. This would make it THE big international event for Space applications.

The operation will take place from 22 to 25 April 2008, centred on five major events:

- The annual European Navigation Conference – **Global Navigation Satellite Systems, ENC-GNSS 08** (23-25 April 2008). This conference is hosted by a different European country every year.
- The European Forum for Time and Frequency, **EFTF 08**, (23–25 April 2008), which is also organised by a different European country every year.
- An international conference on Space applications, **SPACEAPPLI 08** (22-25 April 2008, a follow-up to the conference organised by CNES in December 2006), which will become an annual event in Toulouse.
- An international exhibition for the industry along with business meetings (22–25 April 2008) centred on these applications, which will also become an annual event in Toulouse.
- Associated events for the general public, students and young people, to promote the value of Space applications in civil life, will be organised in parallel throughout the week.

The show is co-organised by **CNES** (for the symposia) and **Midi-Pyrenees Expansion** (for the exhibition and business meetings).

For more information visit:

<http://www.toulousespaceshow.eu/>

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Back Cover – WorldView-1, 50cm panchromatic scene of Yokohama, Japan, taken on October 5<sup>th</sup>, 2007

Image courtesy of DigitalGlobe (<http://www.digitalglobe.com>)

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EARSel Sponsoring Agencies:



Council of Europe



European Space Agency

Information concerning EARSel activities can be obtained from the

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